

GRADING AND DRAINAGE PLAN

GRAND CANYON – SOUTH RIM

FIRING RANGE

FOR

NATIONAL PARK SERVICE

CONTRACTOR: AU AUTHUM KI. INC.

ENGINEER'S EARTHWORK ESTIMATE

CUT	300
FILL	275
NET	25 CUT

THESE QUANTITIES ARE APPROXIMATE WITH NO ADJUSTMENTS MADE FOR SCARIFICATION, SHRINKAGE, OR COMPACTION. CONTRACTOR IS RESPONSIBLE FOR VERIFYING QUANTITIES.

ELEVATION BENCHMARK

BENCH MARK DISK IN ROCK OUTCROPPING AS FOLLOWS:
4.2MI E ON HWY 64, FROM EL TOVAR HOTEL 179 FEET SOUTH OF A ROAD BEARING NORTH, MARKED "BRIDLE TRAIL, SHOSHONE POINT". 1 MILE 152 FEET SOUTH OF THE CENTERLINE OF THE HIGHWAY, AND 175 FEET SOUTH OF A NPS SIGN MARKED "BE CAREFUL WITH FIRE" AND 156 FEET SOUTH OF THE SOUTH END OF A 2-FEET C.I. CULVERT, AND 3.5 FEET NORTH OF A SMALL ROCK MOUND.

POINT ID = U-61, G00057
ELEVATION = 7189.54

ENGINEER'S NOTES

- 1) CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IF LOCATIONS DIFFER FROM PLANS.
- 2) "BLUE STAKE" LOCATES ONLY UTILITIES WITHIN THE PUBLIC RIGHT-OF-WAY AND PUBLIC UTILITY EASEMENTS. CONTRACTOR SHALL PROVIDE OTHER MEANS OF ON-SITE UTILITY LOCATION.
- 3) ALL QUANTITIES LISTED ON THESE PLANS ARE ESTIMATES ONLY. THE CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF THE QUANTITIES AND BASE THEIR BID ON THEIR ESTIMATE.
- 4) THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES IS BASED ON INFORMATION PROVIDED TO THE ENGINEER BY THE UTILITY COMPANIES AND THE CITY, IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UNDERGROUND PIPELINES, TELEPHONE AND ELECTRIC CONDUITS AND STRUCTURES IN ADVANCE OF ANY CONSTRUCTION AND TO OBSERVE ALL POSSIBLE PRECAUTIONS TO AVOID ANY DAMAGE TO SUCH.
- 5) THE ENGINEER IS NOT RESPONSIBLE FOR ANY ESTIMATES, BIDS, CONSTRUCTION, OR OTHER ACTIONS OR DECISIONS MADE WHICH HAVE BEEN BASED ON PRELIMINARY OR UNAPPROVED PLANS.
- 6) THE CONTRACTOR ON SITE SHALL CONFORM TO M.A.G. STANDARD SPECIFICATIONS AND DETAILS, UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIFICATIONS. THE CONTRACTOR SHALL COMPLY WITH A.D.A. REQUIREMENTS RELATING TO CONSTRUCTION AT ALL TIMES.
- 7) ANY ALTERATIONS OR ADDITIONS TO THESE PLANS MUST BE APPROVED BY THE UNDERSIGNED REGISTERED PROFESSIONAL ENGINEER.
- 8) CONTRACTOR SHALL PROVIDE DUST CONTROL FOR ALL UNPAVED AREAS DURING CONSTRUCTION.
- 9) IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COPY OF THE APPROVED GEOTECHNICAL REPORT FOR THIS PROJECT, INCLUDING ANY AND ALL ADDENDUMS AND SUPPLEMENTS ISSUED, AND FOLLOW ALL RECOMMENDATIONS THEREIN.

CSds

COTTRELL, SPARKMAN
DESIGN SPECIALISTS, LLC
34 W. LINDWOOD ST.
PHOENIX, AZ 85003

PH: (602) 307-5281
FAX: (602) 307-5281

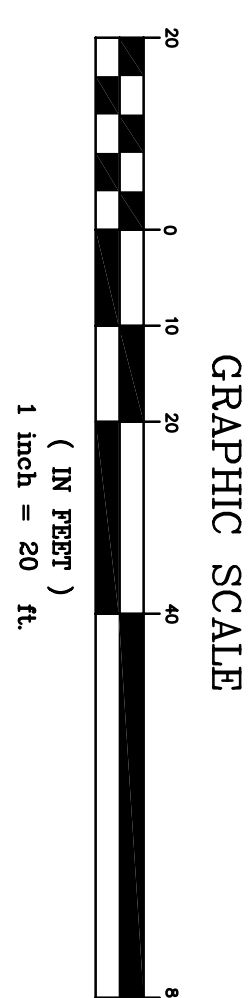

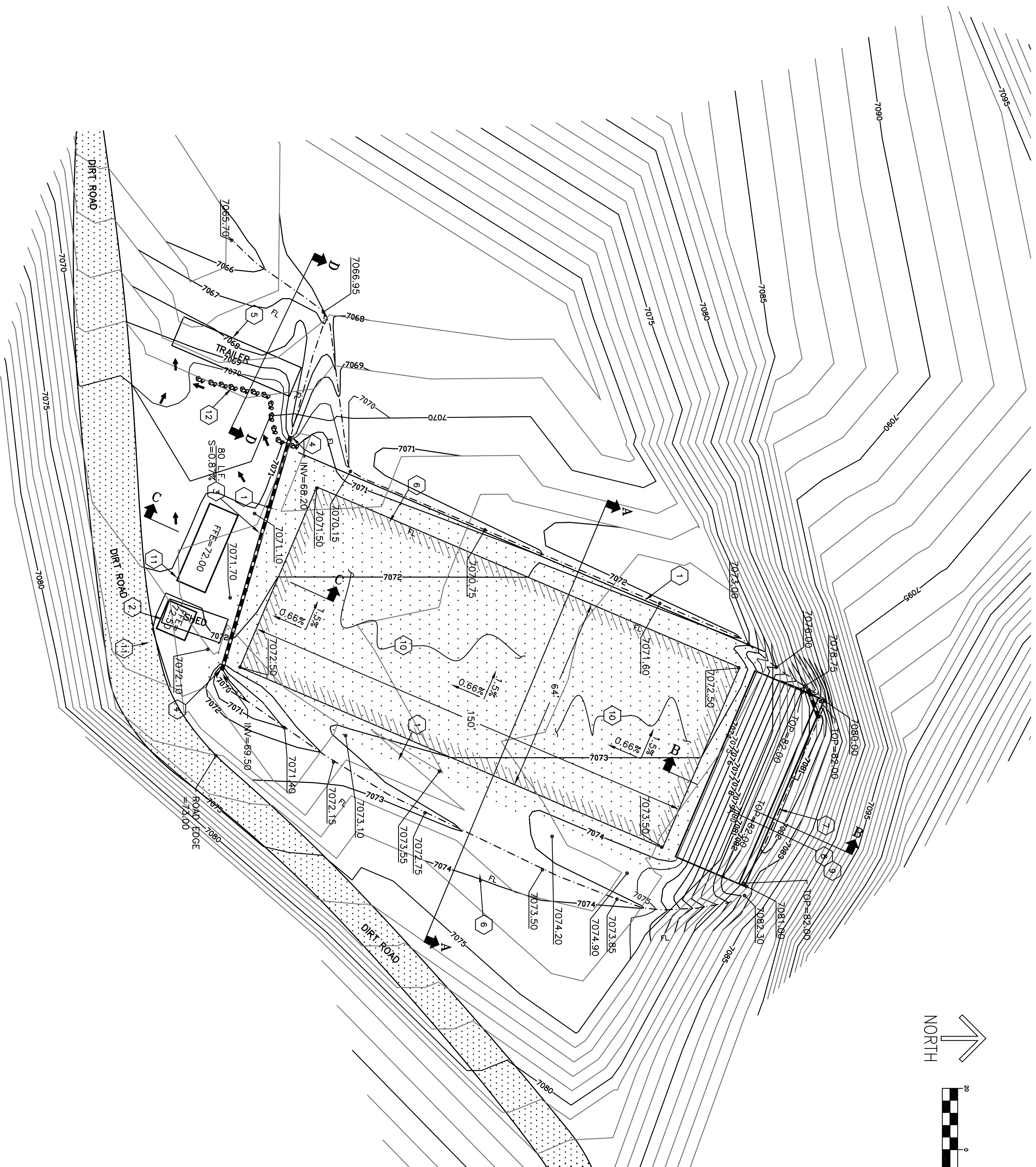
Registered Professional Engineer
EMC 1
SPARKMAN
No. 17066, U.S.A.

DESIGNED:
NJC
TECH. REVIEW:
EMS
DATE: 09/01/04

SUB SHEET NO.
C1.01
CIVIL COVER SHEET

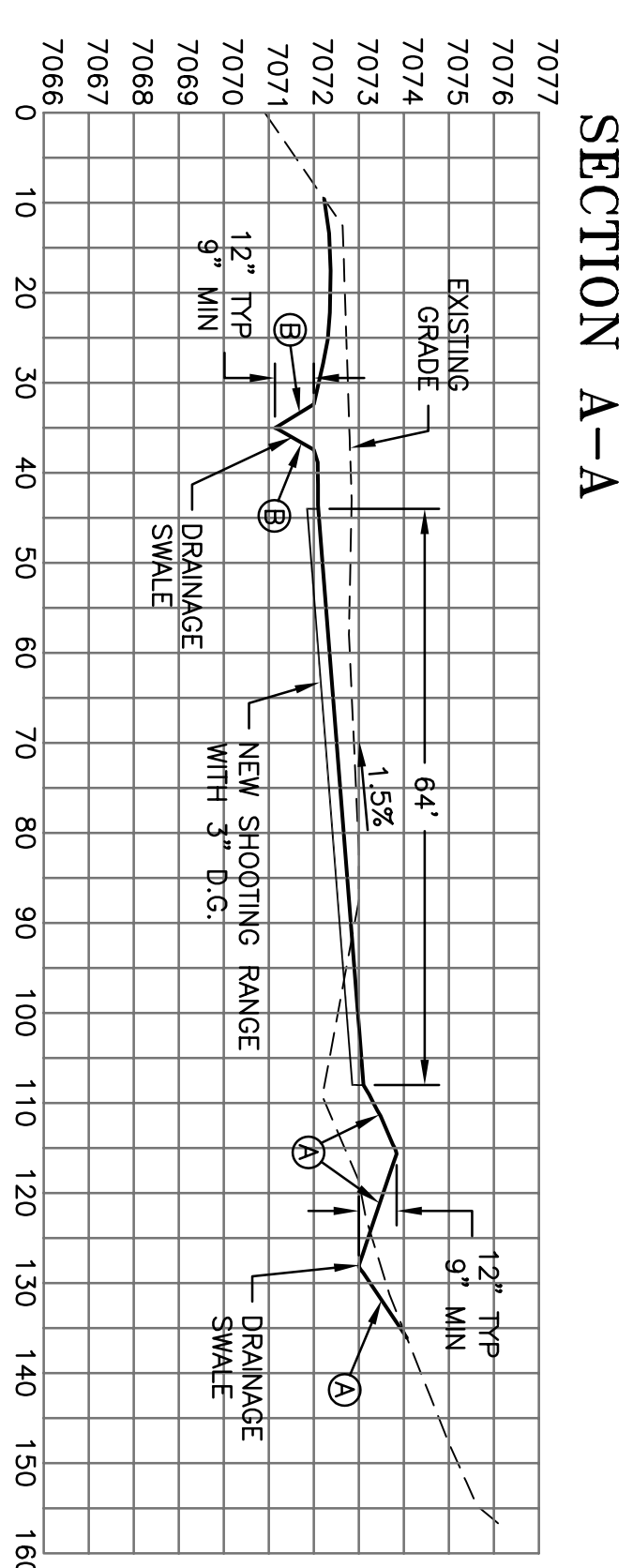
TITLE OF SHEET
REMEDIATE/REHABILITATE
FIRING RANGE
SOUTH RIM
GRAND CANYON
NATIONAL PARK

DRAWING NO.
113
4120
PG. NO. 05
34
82 OF SHEET 3 OF 12

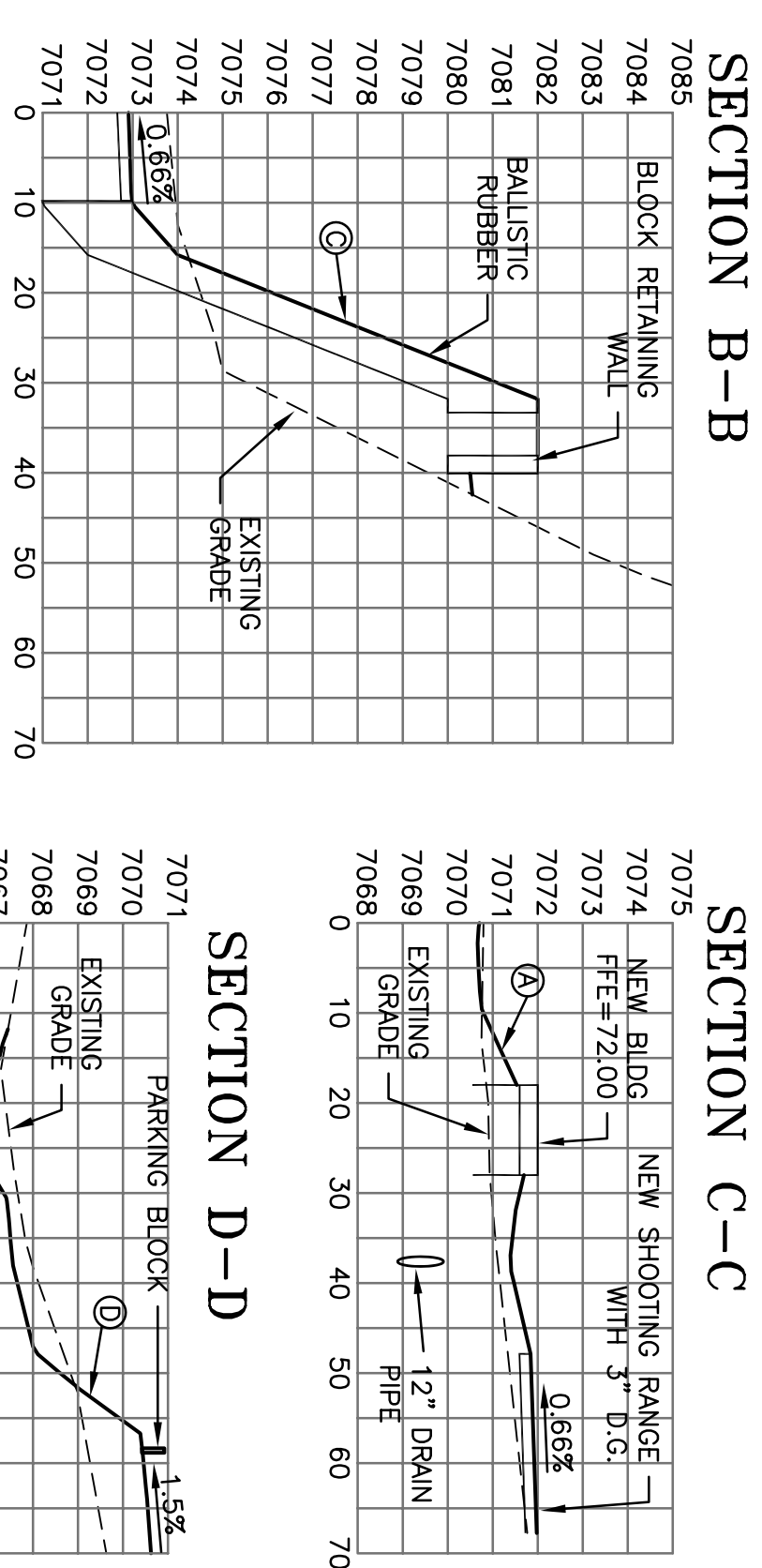


KEYNOTES

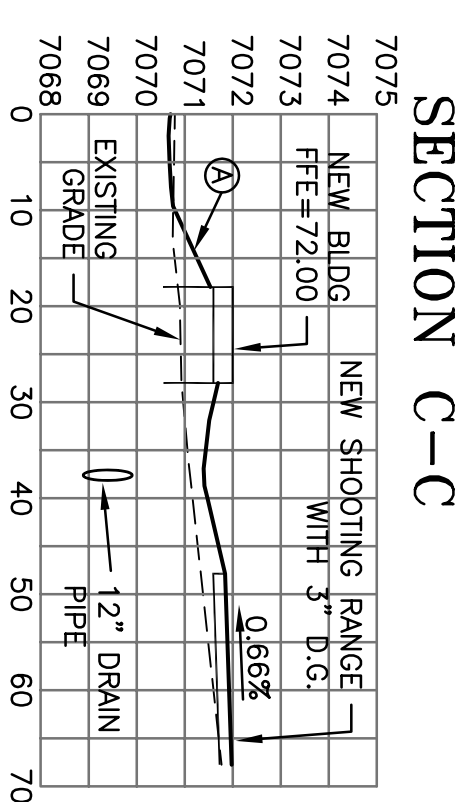
- ① EXISTING SHOOTING RANGE. CONTRACTOR TO REGRADE AND REMOVE ANY PHYSICAL STRUCTURES.
- ② REMOVE EXISTING STORAGE CONTAINER. CONTRACTOR TO RELOCATED AS DIRECTED BY THE NATIONAL PARK SERVICE.
- ③ INSTALL 12" DIA. CORRUGATED HDPE W/SMOOTH INTERIOR (AND N-12 OR EQUIV.) TRENCHING, BEDDING COMPACTION PER MANUFACTURER'S SPECIFICATIONS. MAINTAIN 18" MIN COVER, INVERTS, SLOPES, LENGTHS AS SHOWN.
- ④ PIPE INLET/OUTLET. PIPE INVERTS AS SHOWN. INSTALL 6 SF 14" THICK PLACED/AGG. RAMP- RIP-RAP. USE NATIVE STONE MATERIAL. ROCK DIAMETERS BETWEEN 2" AND 8".
- ⑤ REMOVE EXISTING TRAILER. SEE SITE PLAN.
- ⑥ DRAINAGE SWALE. SEE SECTIONS, THIS SHEET. FOR DETAILS.
- ⑦ CONSTRUCT BLOCK RETAINING WALL. SEE "SUPER TRAP" DRAWINGS FOR BLOCK TYPE AND SPECIFICATIONS.
- ⑧ GRADE 2:1 SLOPE, COVERED WITH 24" MIN OF BALLISTIC RUBBER PER "SUPER TRAP" DRAWINGS. GRADES SHOWN ARE TO TOP OF RUBBER.
- ⑨ CONSTRUCT EARTHEN MOUND. COMPACTED TO 85% MAX DENSITY PER STANDARD PROCTOR. COMPACT IN 8" LIFTS MAX.
- ⑩ GRADE SHOOTING RANGE AS SHOWN. COVER WITH 4.0" THICK POLYETHYLENE MULCH (NATIVE SOIL, 55% BULK DENSITY SHOWN ARE TO FINISHED GRADE).
- ⑪ NEW BUILDINGS. SEE SITE PLAN AND ARCHITECTURAL PLANS.
- ⑫ PLACE LARGE DIAMETER (24") NATIVE BUNDERS TO PROTECT EMBAZMENTERS FROM VEHICULAR TRAFFIC.



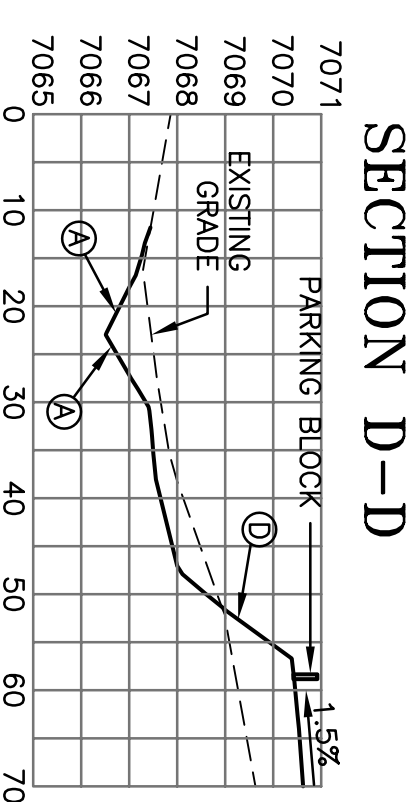
SECTION A-A



SECTION B-B



SECTION C-C


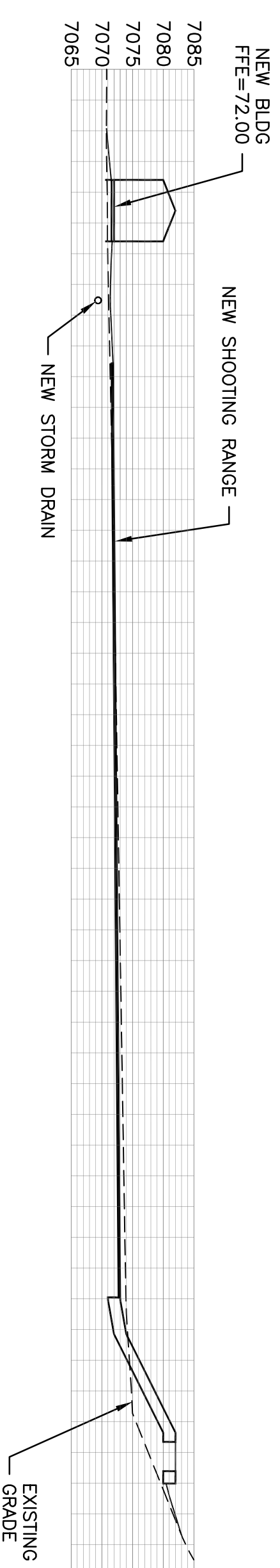


SECTION D-D

SIDE SLOPES	
(A) 6:1 TYP	3:1 MAX
(B) 3:1 TYP	3:1 MAX
(C) 2:1	
(D) 4:1	

NOTE:
SEE LEFT FOR SECTIONS B-B AND C-C
COMBINED, WITHOUT VERTICAL EXAGGERATION

SECTION B-B AND C-C COMBINED (TRUE SCALE)



**COTTELL, SPARKMAN
DESIGN SPECIALISTS, LLC**
34 W. LYNNWOOD ST.
PHOENIX, AZ 85003

PH: 602.233.8888
FAX: 602.233.8888

DESIGNED:	SUB SHEET NO.
NJC	
gmp	
NJC	
TECH. REVIEW:	
EMS	
DATE:	
09/01/04	

C1.02

GRADING AND DRAINAGE

C1.02

GRADING AND DRAINAGE

REMEDiate/REHABILITATE
FIRING RANGE
SOUTH RIM
GRAND CANYON
NATIONAL PARK

DRAWING NO.
113
4120

PKG. NO.	SHEET
<u>05</u>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">4</div>
<u>34</u>	
<u>82</u>	OF <u>12</u>

GRAND CANYON – SOUTH RIM
FIRING RANGE

ELEVATION BENCHMARK

BENCH MARK DIS IN ROCK OUTCROPPING AS FOLLOWS:
4.2M E ON HWY 64. FROM EL TOVAR HOTEL 179 FEET SOUTH
OF A ROAD BEARING NORTH, MARKED "BRIDLE TRAIL, SHOSHONE
POINT". 1 MILE 152 FEET SOUTH OF THE CENTERLINE OF THE
HIGHWAY, AND 175 FEET SOUTH OF A NPS SIGN MARKED "BE
CAREFUL WITH FIRE" AND 156 FEET SOUTH OF THE SOUTH END OF
A 2-FOOT G.I. CULVERT, AND 3.5 FEET NORTH OF A SMALL ROCK
MOUND.

POINT ID = U-61, GQ0057
ELEVATION = 7189.54

ENGINEER'S NOTES

- 1) CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IF LOCATIONS DIFFER FROM PLANS.
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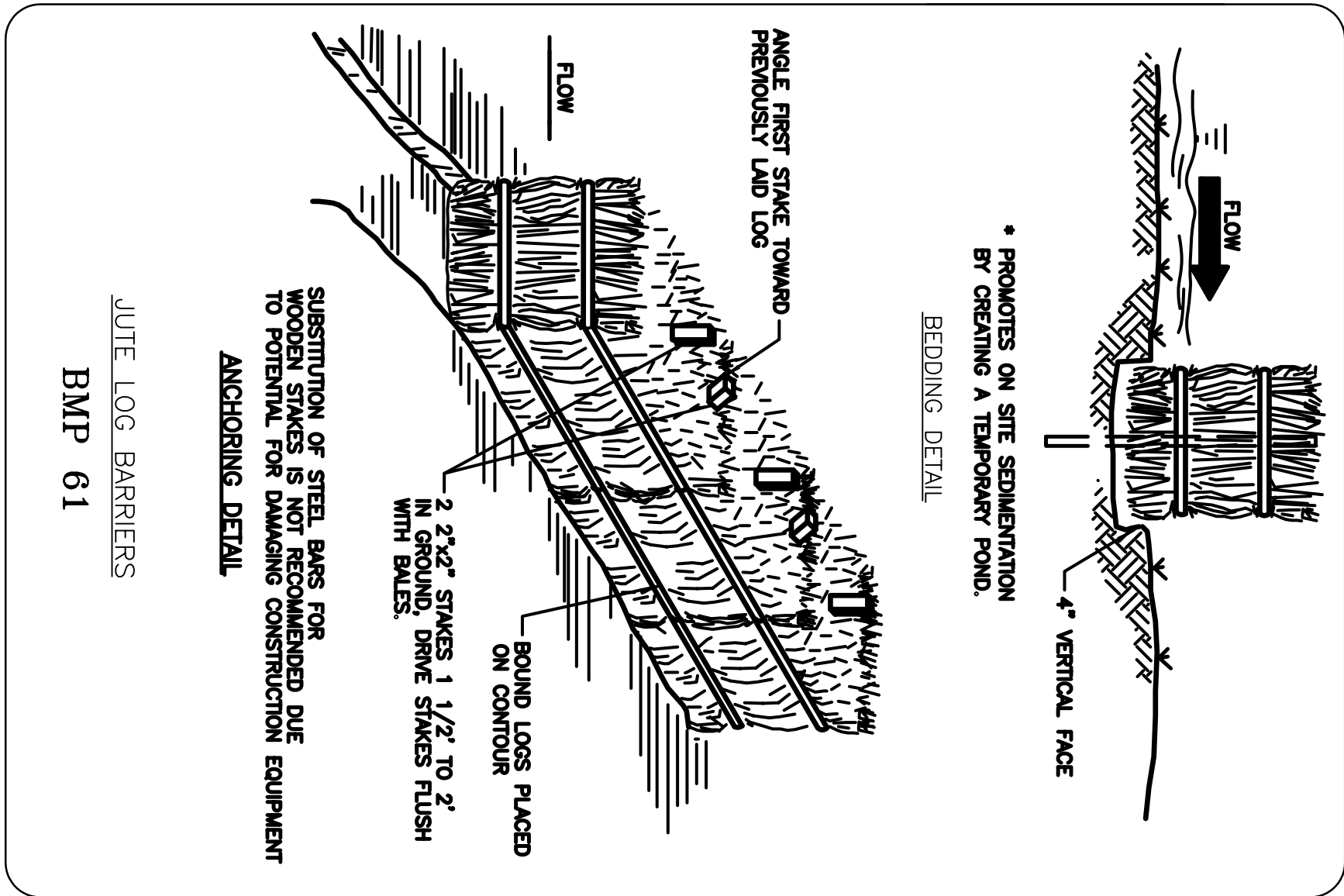
NOTES FOR STORM WATER MANAGEMENT PLAN

1. THE OPERATOR SHALL AMEND THIS PLAN AS NECESSARY DURING THE COURSE OF CONSTRUCTION TO RESOLVE ANY PROBLEM AREAS, WHICH BECOME EVIDENT DURING THE CONSTRUCTION AND/OR DURING RAINFALLS.
2. THE PERMITTEE SHALL FILE A NOTICE OF TERMINATION (NOT) AFTER COMPLETION OF CONSTRUCTION.
3. THE PERMITTEE SHALL SAVE ALL RECORDS, INCLUDING THE NOI, SWMP, NOT, AND INSPECTION REPORTS, ON FILE FOR A MINIMUM OF THREE YEARS FROM THE DATE OF FILING THE NOI.
4. THE IMPLEMENTATION OF THESE PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPDATING OF THESE FACILITIES IS THE RESPONSIBILITY OF THE PERMITTEE/CONTRACTOR UNTIL ALL CONSTRUCTION IS APPROVED AND NOT SUBMITTED.
5. THE FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES IN SUCH A MANNER AS TO INSURE THAT SEDIMENT-LADEN WATER DOES NOT ENTER THE DRAINAGE SYSTEM OR VIOLATE APPLICABLE WATER STANDARDS, AND MUST BE INSTALLED AND IN OPERATION PRIOR TO ANY GRADING OR LAND CLEARING. WHEREVER POSSIBLE, MAINTAIN NATURAL VEGETATION FOR SILT CONTROL.

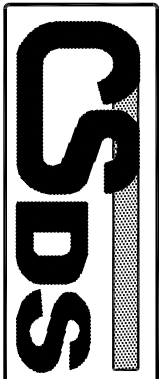
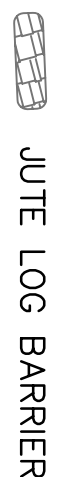
NATIONAL PARK SERVICE
CONTRACTOR: AU AUTHUM KI. INC.

INDEX OF DRAWINGS

- | | |
|-------|------------------------------|
| C2.01 | COVER SHEET - NOTES, DETAILS |
| C2.02 | STORM WATER MANAGEMENT |






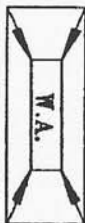

LEGEND



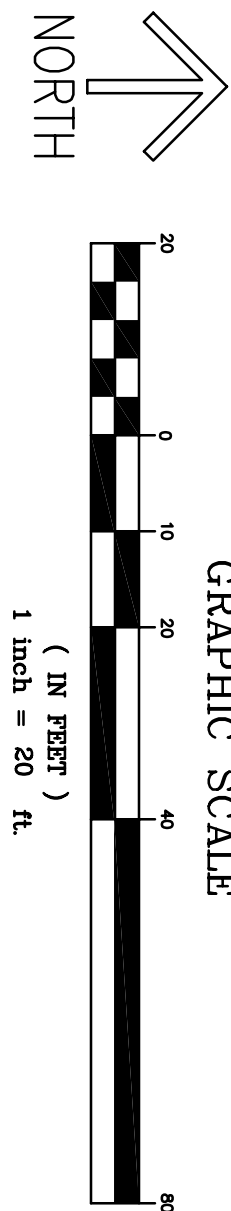
COTTRELL, SPARKMAN
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34 W. LYNNWOOD ST.
PHOENIX, AZ 85003
PH: (602) 307-5281
FAX: (602) 307-5361

DESIGNED:	SUB SHEET NO.		TITLE OF SHEET
NJC	C2.01	REMEDATE/REHABILITATE	
EXIST		FIRING RANGE	
NJC		SOUTH RIM	
TECH. REVIEW:		GRAND CANYON	
EMS	WATER		NATIONAL PARK
DATE:	STORM		
9/01/04	PLAIN		
		PKG. NO.	SHEET
		05	5
		34	OF 12
		82	
		DRAWING NO.	
		113	
		4120	

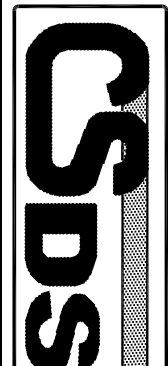
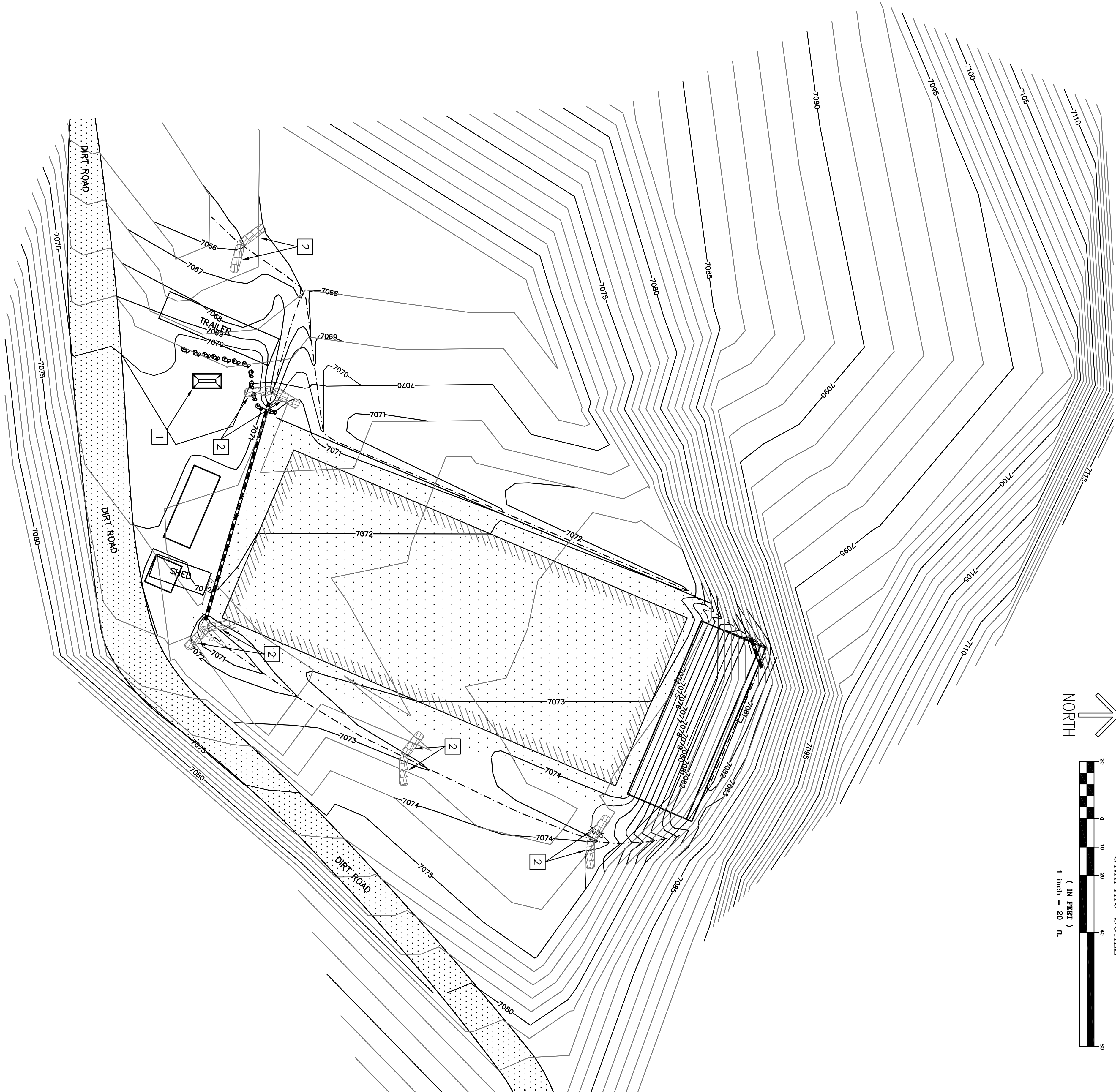
SYMBOL 	DESIGNATED WASHOUT AREA	
DIAGRAM 	CONDITIONS WHERE PRACTICE APPLIES	— PERMETER CONTROL — SLOPE PROTECTION — SEDIMENT TRAPPING — DRAPENET AND STRAIN — TEMPORARY STABILIZATION — PERMANENT STABILIZATION & EXPOSURE LIMITS — NON-SEDIMENT POLLUTION CONTROL
DEFINITION <p>A temporary pit or bermed area for washout of concrete trucks, tools, mortar mixers, etc.</p>	PURPOSE <p>Improve washout of concrete trucks, tools, etc. may allow fresh concrete or cement laden mortar to enter a storm drainage system.</p>	APPROPRIATE APPLICATIONS <p>Effective when vehicles, tools, and mixers can be moved to the pit location. Where this is not practical, temporary ponds may be constructed to allow for settling and hardening of cement and aggregates. Washout areas/pits are appropriate for minor amounts of wash water which result from cleaning of aggregate materials or concrete trucks, tools, etc.</p>
PLANNING CONSIDERATIONS <ol style="list-style-type: none"> 1. Wash out into a slurry pit which will later be backfilled. Do this only with the approval of the property owner. 2. Wash out into a temporary pit where the concrete wash can harden, be broken up, and then properly disposed of off-site. 	BMP 99	

 SYMBOL	DESIGNATED WASHOUT AREA <div data-bbox="1038 2749 1093 2832">  <p> FEDERAL HIGHWAY ADMINISTRATION DEPARTMENT OF TRANSPORTATION 1 OF 2 </p> </div>
<p><u>DESIGN & SIZING CRITERIA</u></p> <ol style="list-style-type: none"> 1. Locate wash out pits away from storm drains, open ditches, or stormwater receiving waters. 2. DO NOT wash out concrete trucks into storm drains, sanitary sewers, street gutters, or stormwater channels. <p><u>MAINTENANCE REQUIREMENTS</u></p> <p>Properly dispose of hardened concrete products on a routine basis to prevent the buildup of waste materials to an unmanageable size and to maintain percolation of water.</p> <p>Reference (14)</p>	

BMP 99

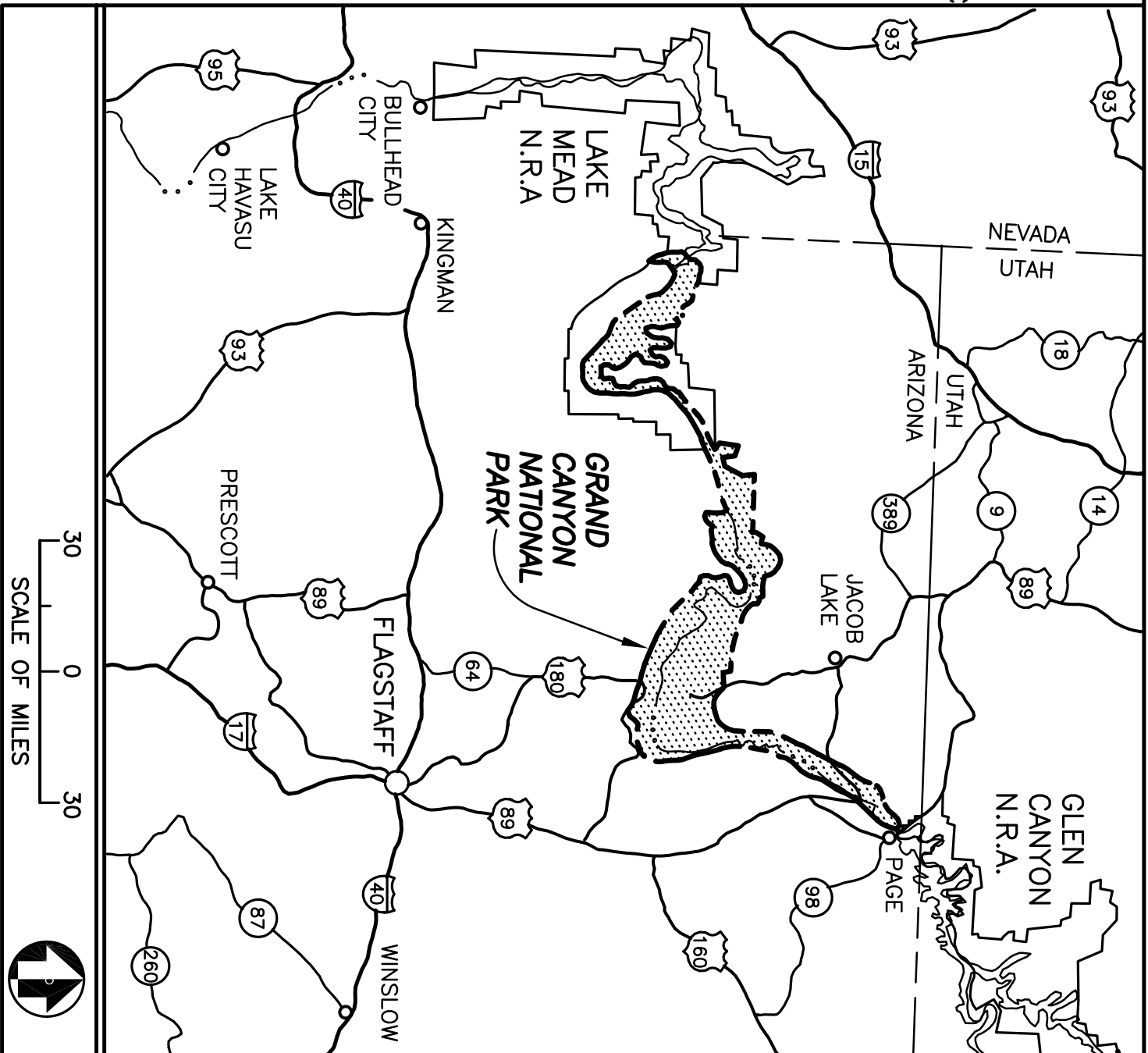


- CONSTRUCTION NOTES
- 1 CONSTRUCT WASHOUT AREA PER BMP 99 ON SHEET C2.01.
- 2 INSTALL JUTE LOG BARRIERS AS SHOWN ON DETAIL SHEET C2.01. SPACED AT 75 FT. INTERVALS.



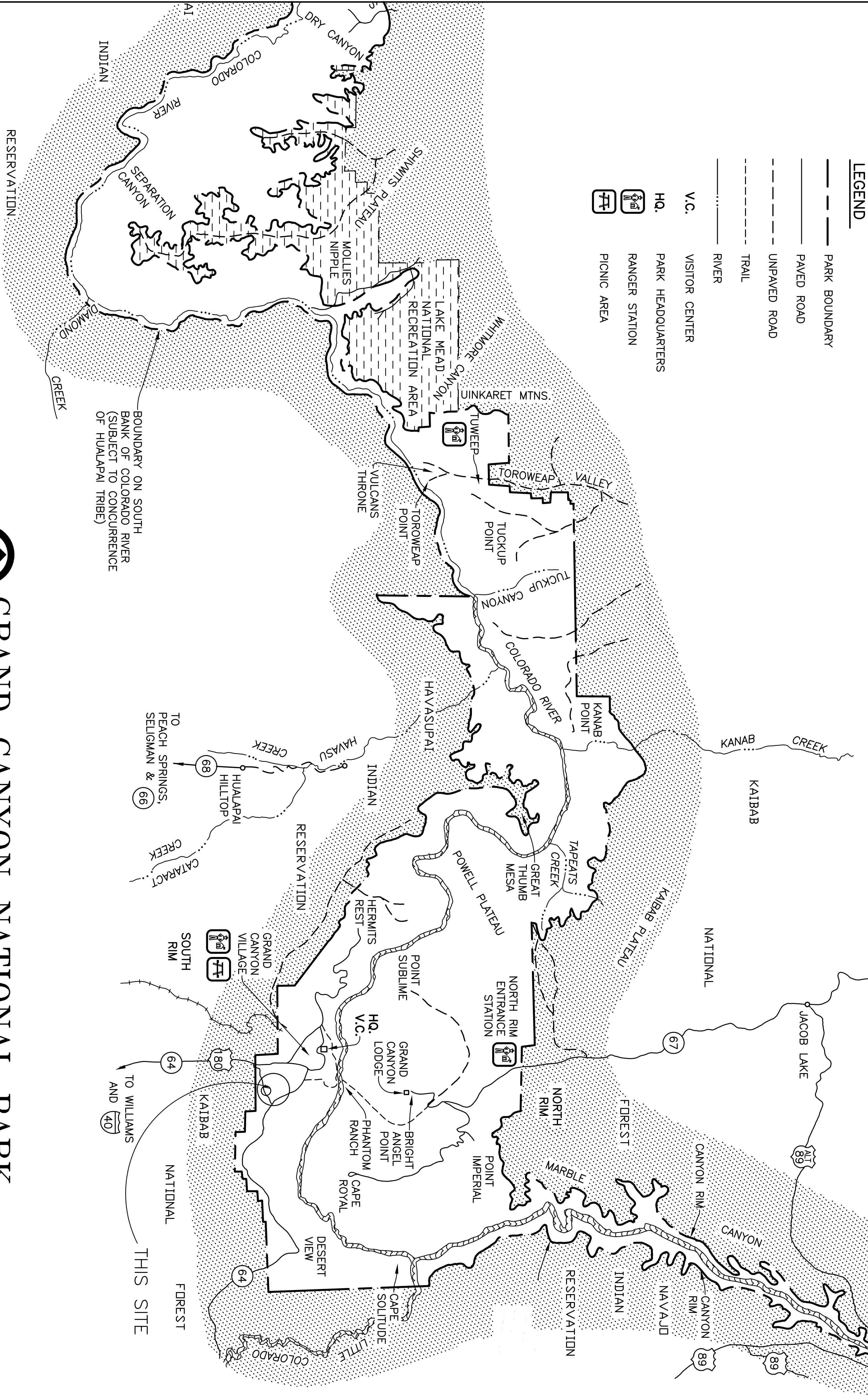
COTTRELL, SPARKMAN
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34 W. LYNNWOOD ST.
PHOENIX, AZ 85003
PH: (602) 307-5281
FAX: (602) 307-5361

DESIGNED: NJC	SUB SHEET NO. C2.02	TITLE OF SHEET REMEDIATE/REHABILITATE FIRING RANGE SOUTH RIM GRAND CANYON NATIONAL PARK	DRAWING NO. —
TECH. REVIEW: NJC	STORM WATER PLAN		
DATE: 9/1/04			
PKG. NO. 05			
SHEET 34			
82			
6			
12			



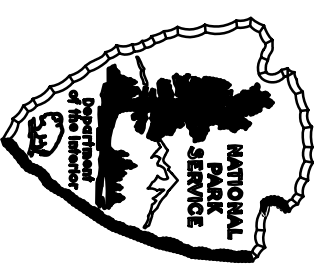
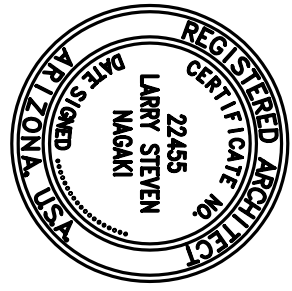
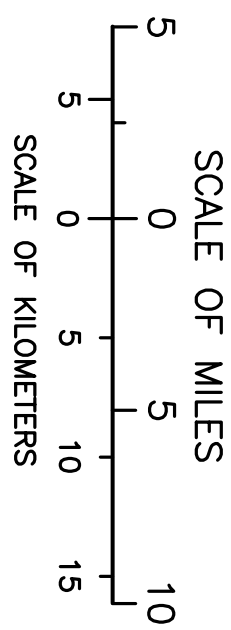
Sheet Index

- COVER
- SA-1 SITE PLAN
- C1-01 CIVIL COVER SHEET
- C1-02 GRADING AND DRAINAGE
- C2-01 COVER SHEET - STORM WATER PREVENTION
- C2-02 STORMWATER PREVENTION PLAN
- A-1 FLOOD PLAN/DRAINING PLAN
- A-2 ELEVATIONS
- A-3 CAMPY SECTION AND DETAILS
- A-4 STORAGE BUILDING SECTION AND DETAILS
- ST-1 SUPER TRAP PLAN & SECTION
- ST-2 SUPER TRAP DETAILS



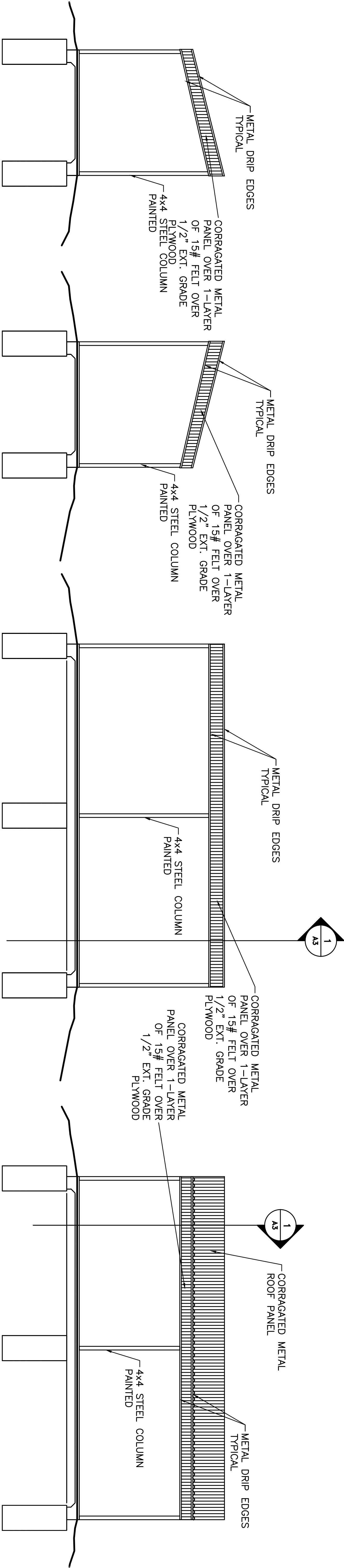
GRAND CANYON NATIONAL PARK
WORLD HERITAGE SITE

C1211040908
PMIS 053482



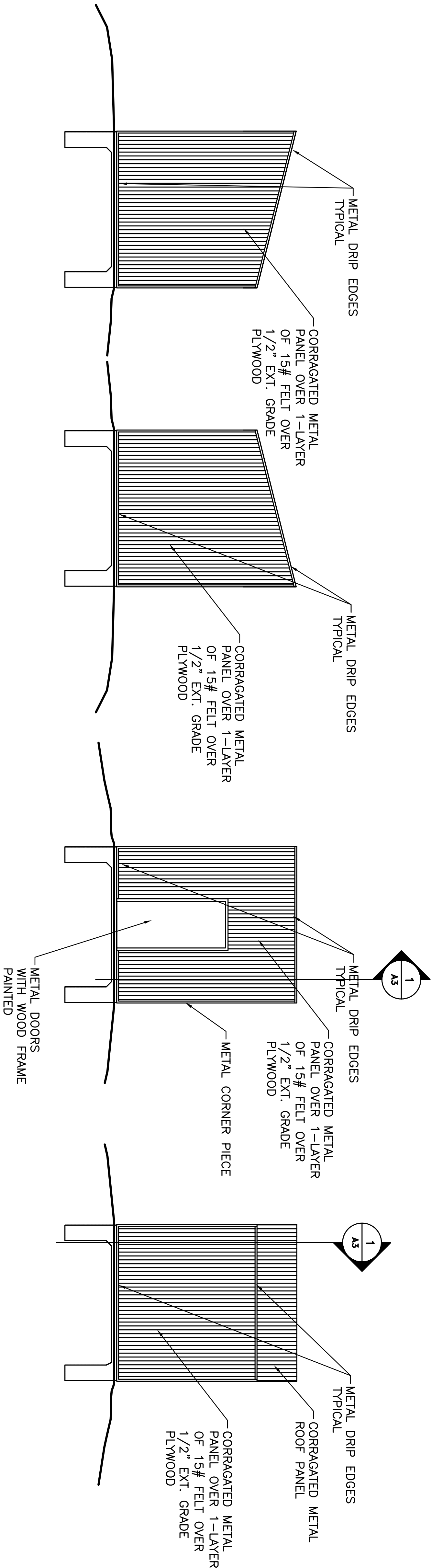
BASIC DATA:

CONSTRUCTION DOCUMENTS			SHOOTING RANGE		
UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE DENVER SERVICE CENTER			TITLE OF DRAWING LOCATION WITHIN PARK NAME OF PARK STATE COUNTY		
GRAND CANYON NATIONAL PARK			DRAWING NO. 113		
SOUTH RIM			4120		
NATIONAL PARK SERVICE			PAC. NO. 1		
DENVER SERVICE CENTER			SHEET 1		
INTERMOUNTAIN			OF 12		



ELEVATIONS - SHELTER CANOPY

SCALE: 1/4" = 1'-0"

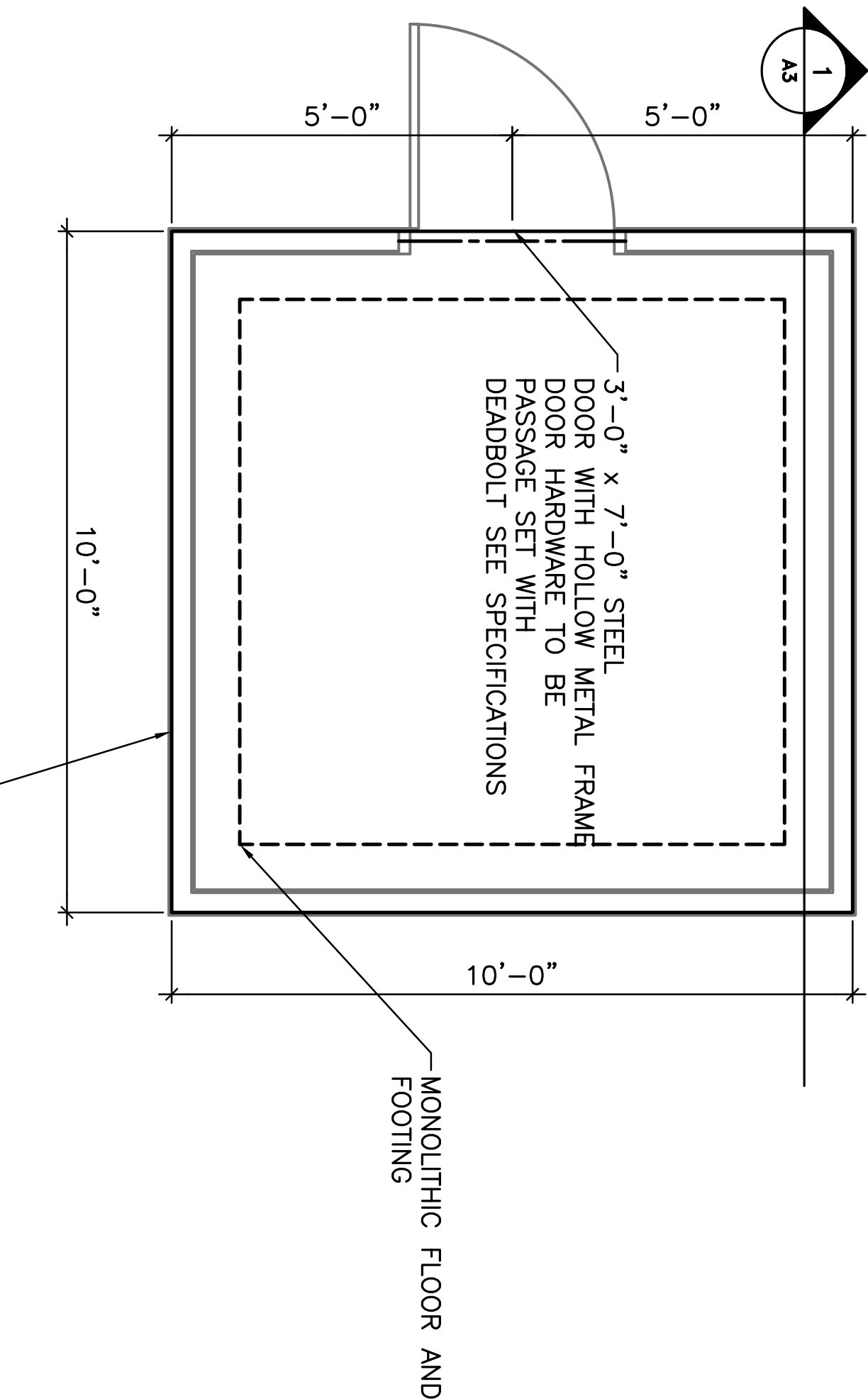


ELEVATIONS - STORAGE UNIT

SCALE: 1/4" = 1'-0"

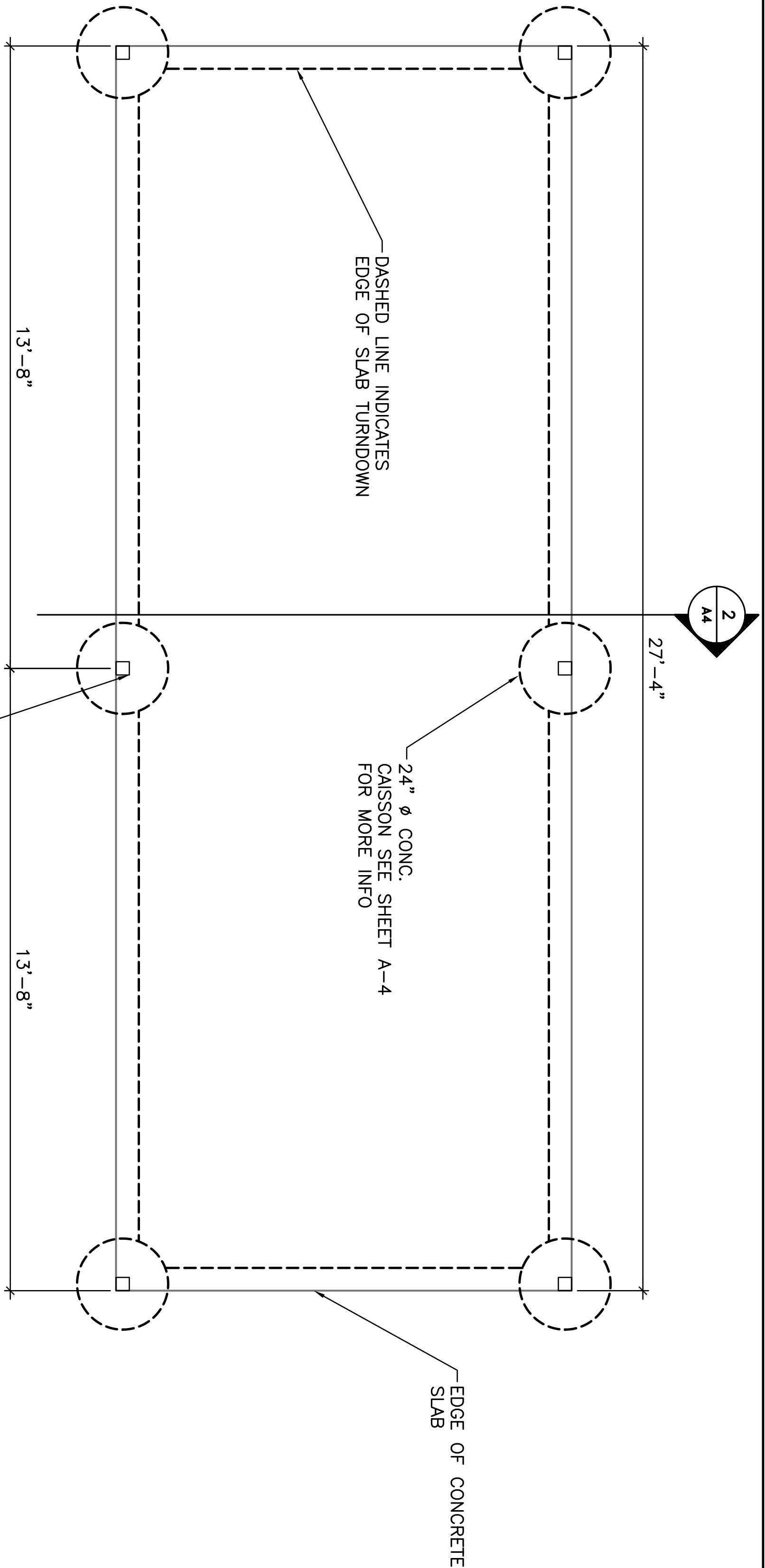


DESIGNED: L. NAGAKI 8/11/04	SUB SHEET NO. A-2	TITLE OF SHEET REMEDIATE/REHABILITATE FIRING RANGE SOUTH RIM GRAND CANYON NATIONAL PARK	DRAWING NO. 113 4120
DATE: 8/11/04	PKG. NO. 8	SHEET 8	of 12



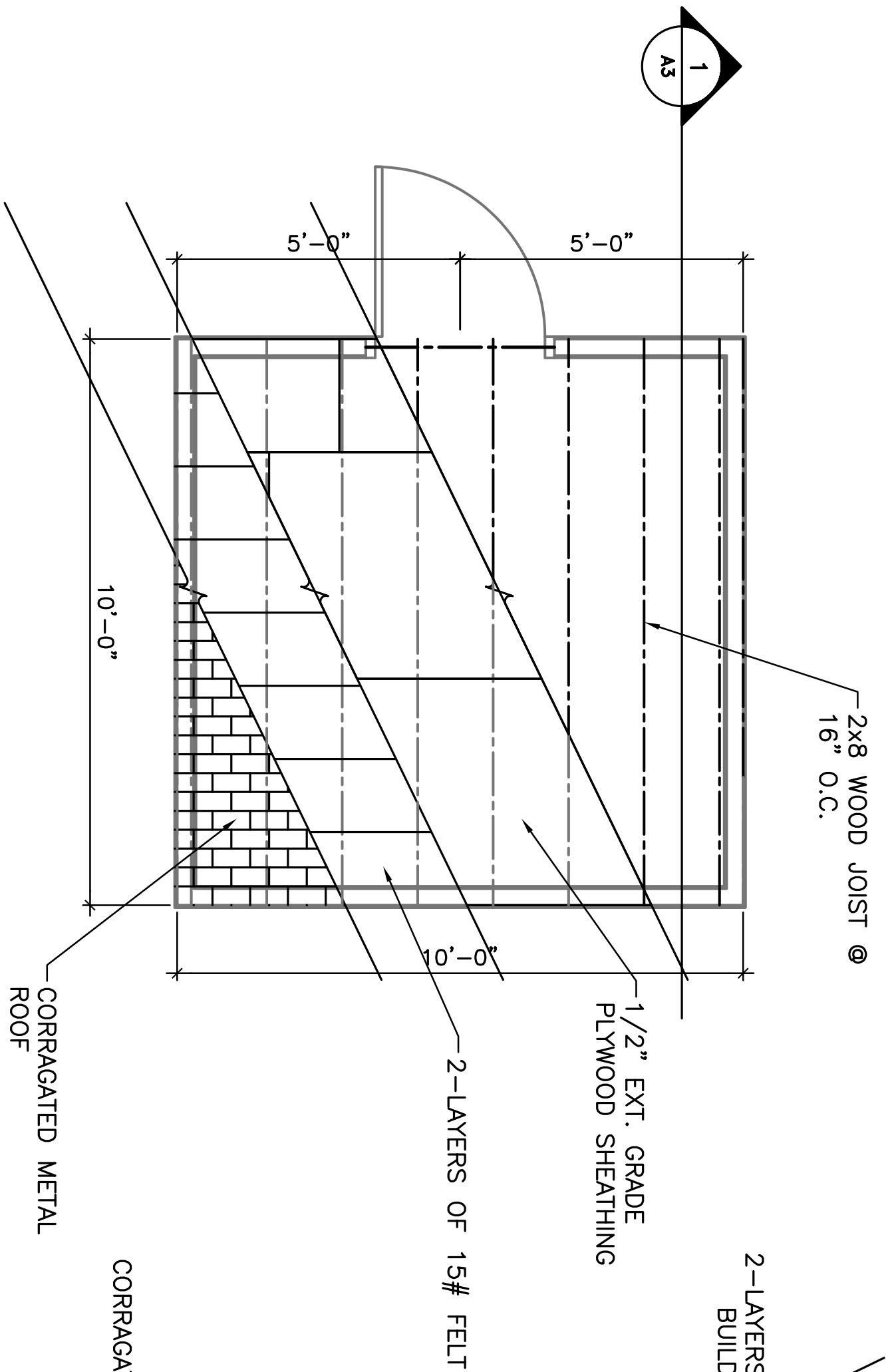
FLOOR/FOUNDATION PLAN - STORAGE

SCALE: 1/4" = 1'-0"



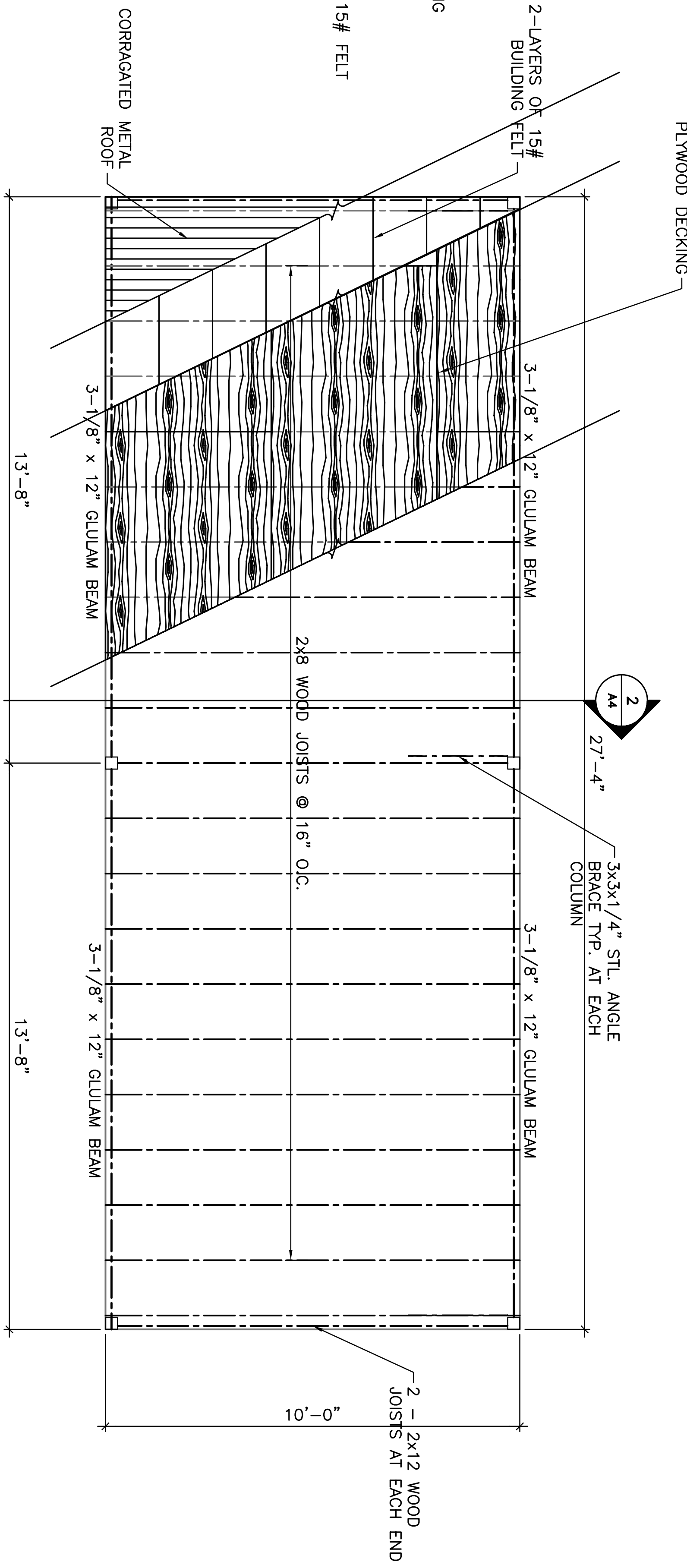
FLOOR/FOUNDATION PLAN - CANOPY

SCALE: 1/4" = 1'-0"



ROOF FRAMING PLAN - STORAGE

SCALE: 1/4" = 1'-0"

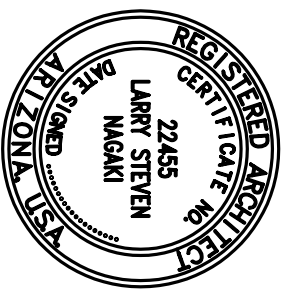
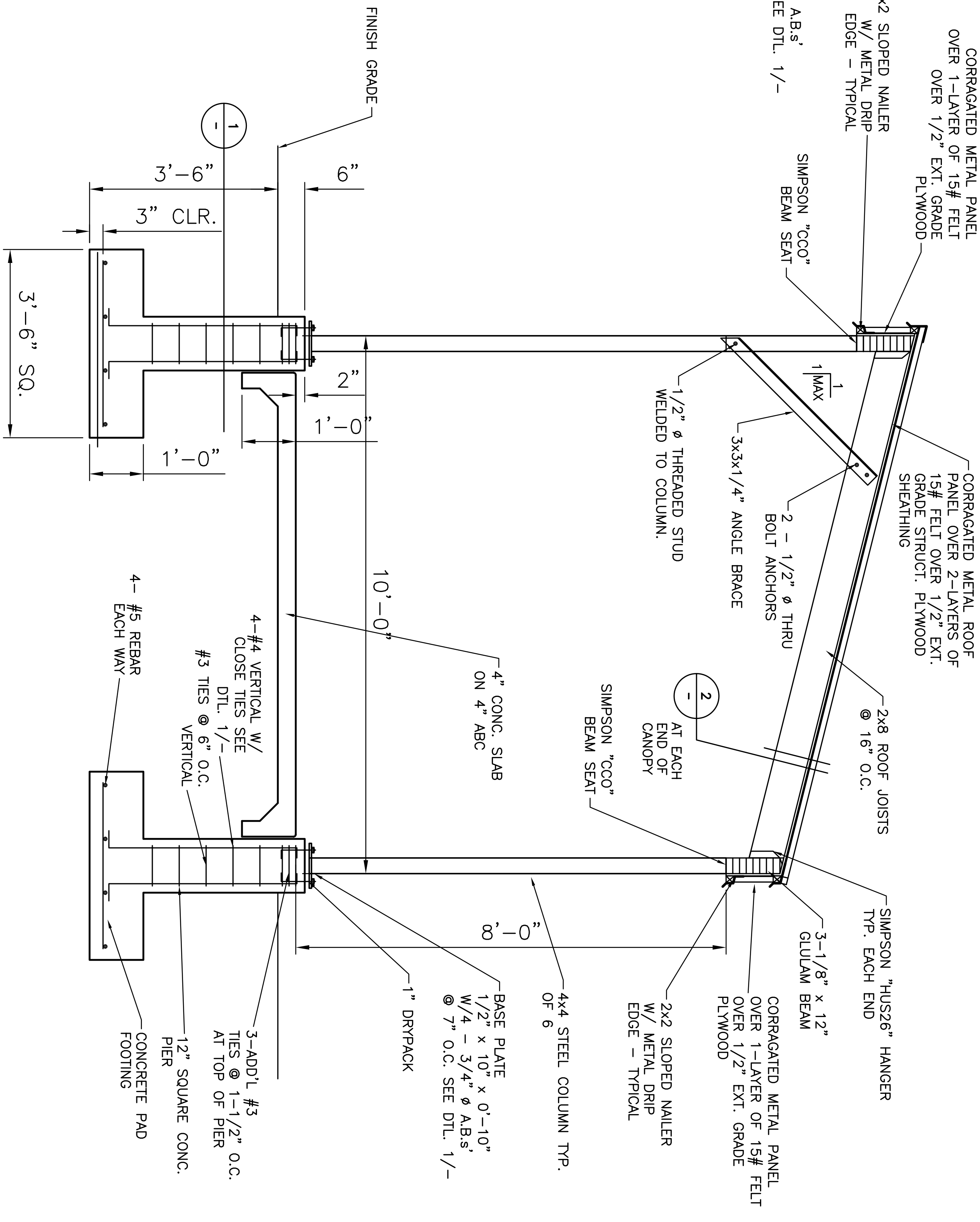
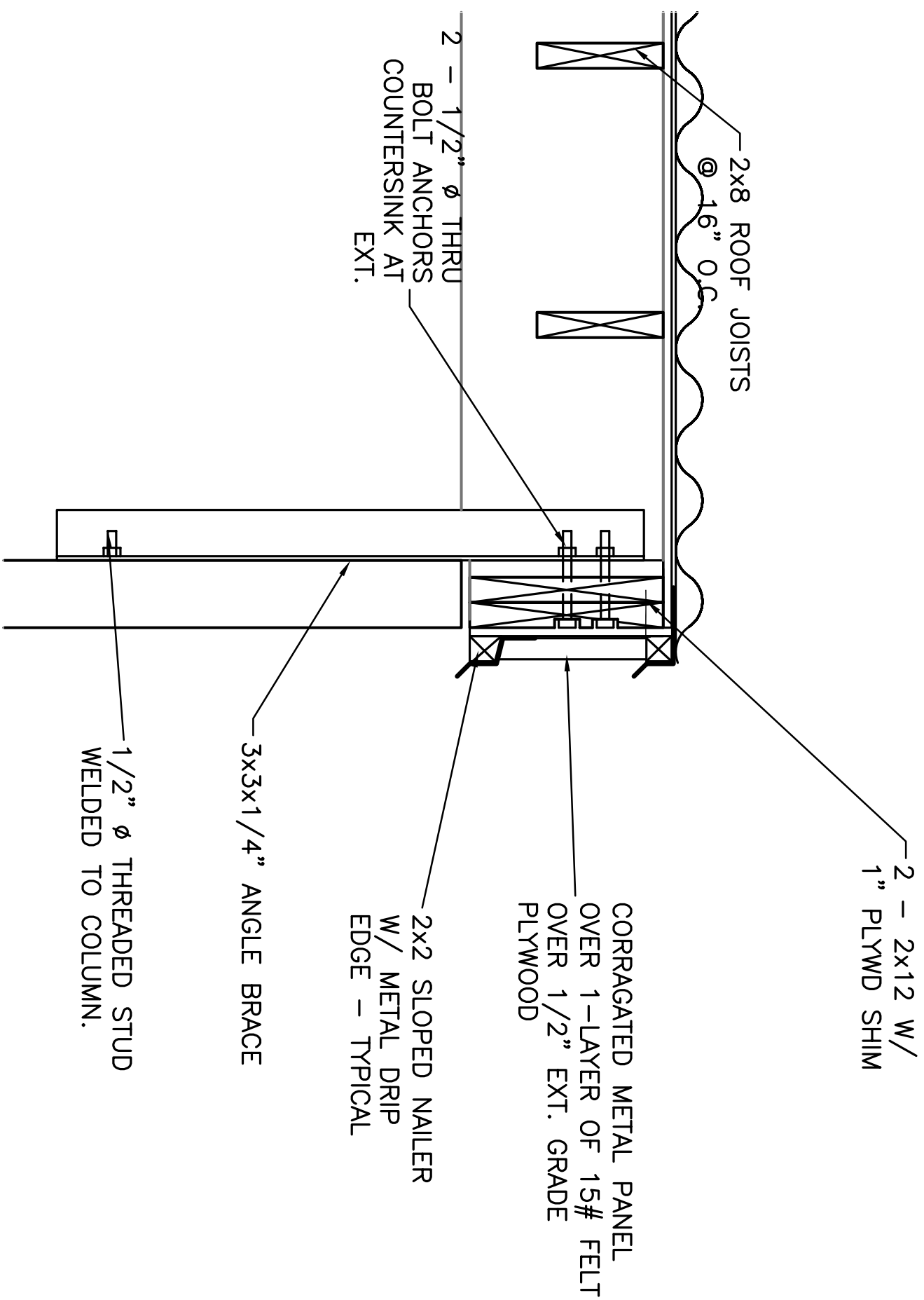
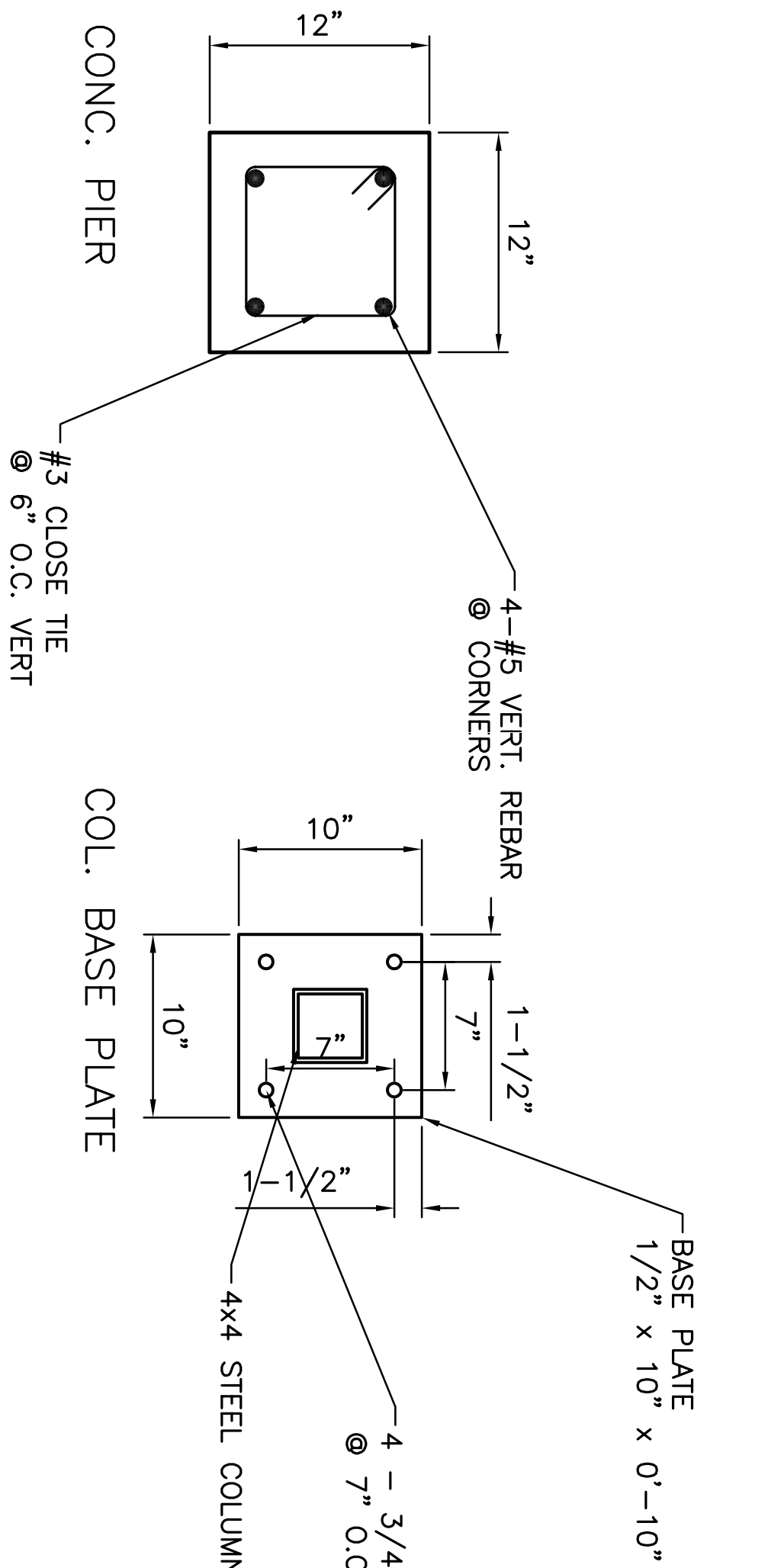


ROOF FRAMING PLAN - CANOPY

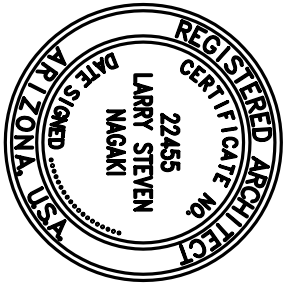
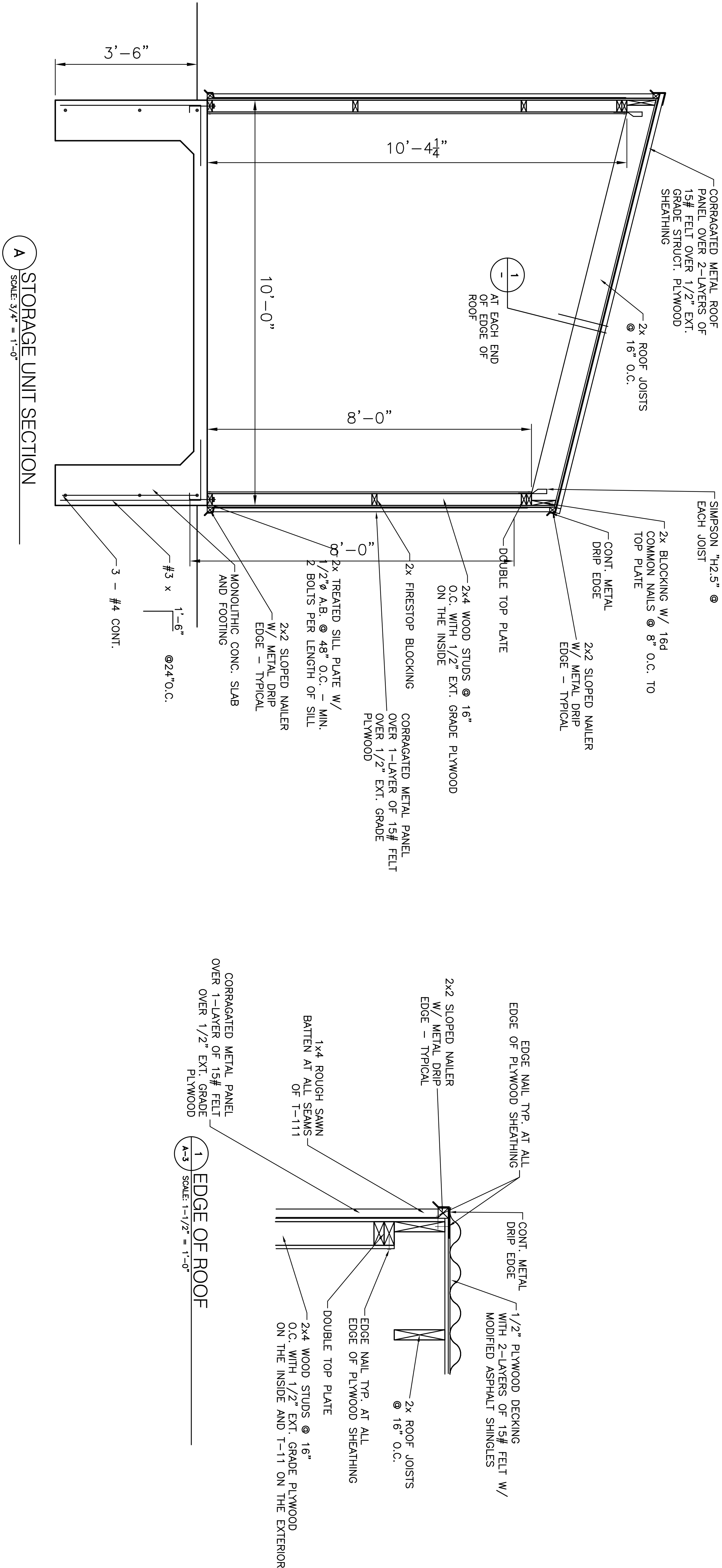
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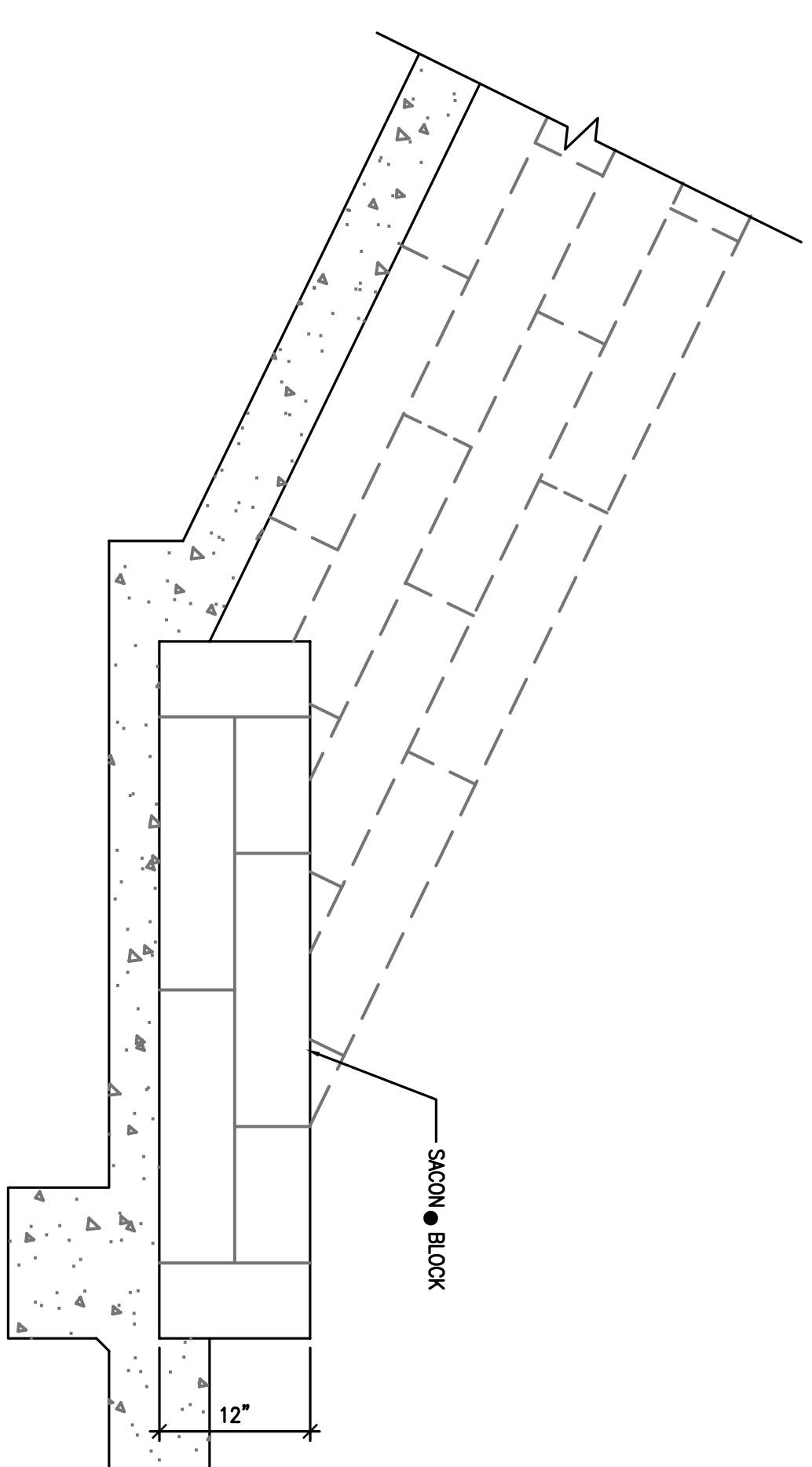
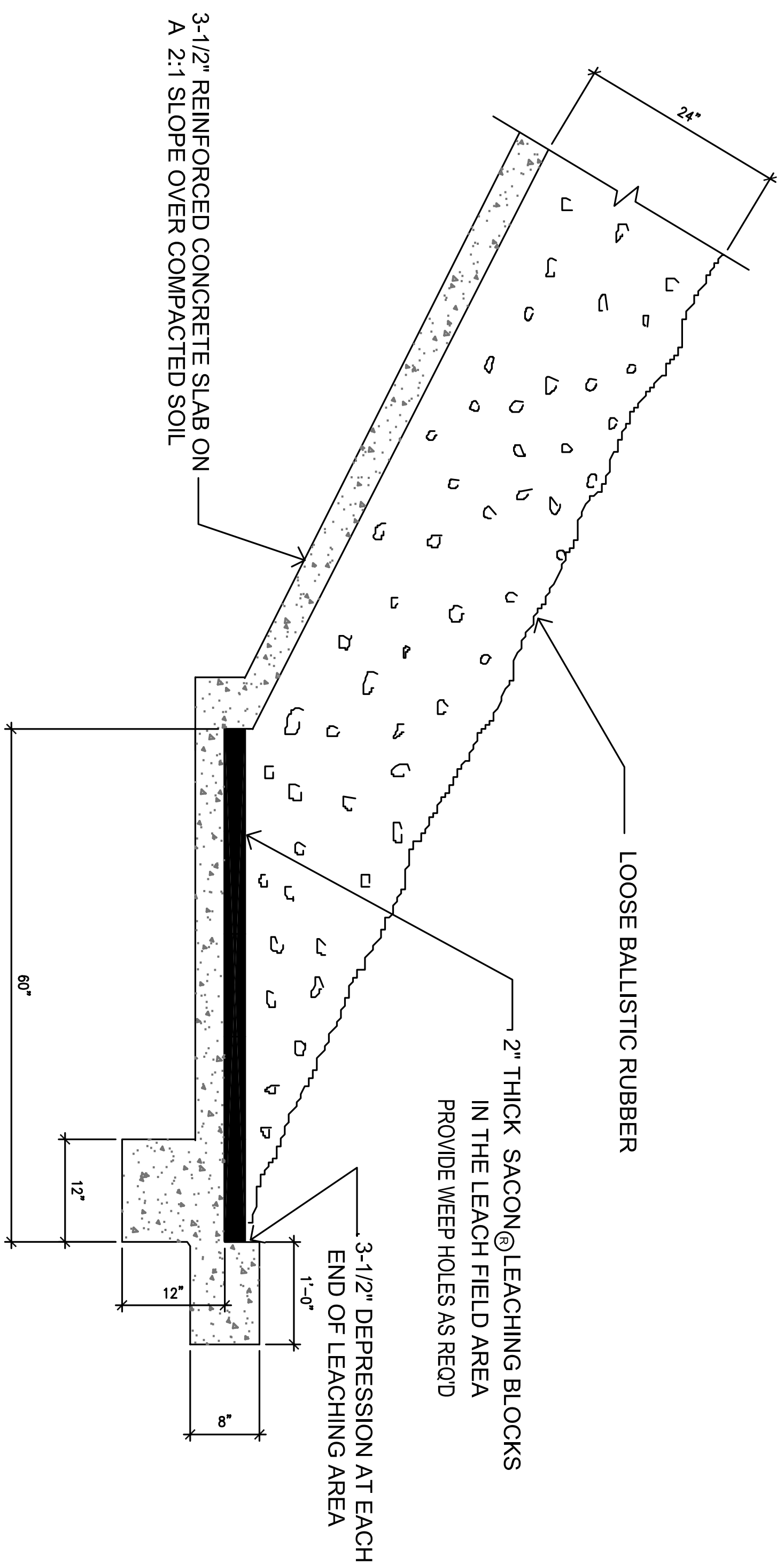
DESIGNED: LNAGAKI	SUB SHEET NO. A-1	TITLE OF SHEET REMEDIATE/REHABILITATE FIRING RANGE SOUTH RIM GRAND CANYON NATIONAL PARK	DRAWING NO. 113 4120
DATE: 8/11/04	PKG. NO. 05 34 82	TECH. REVIEW: LNAGAKI	SHEET 7 OF 12



DESIGNED: L.NAKAKI	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
22465 LARRY STEPHENSON REGISTERED PROFESSIONAL ENGINEER STATE OF ARIZONA		REMEDiate/REHABILITATE FIRING RANGE SOUTH RIM GRAND CANYON NATIONAL PARK	113 4120
CHKD: L.NAKAKI			PKG. NO. 34
TECH. REVIEW: L.NAKAKI			SHEET NO. 10
DATE: 8/11/04			OF 12



DESIGNED: L. NAKAKI	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
CHKD: L. NAKAKI		REMEDiate/REHABILITATE	113
TECH. REVIEW: L. NAKAKI		FIRING RANGE	4120
DATE: 8/11/04		SOUTH RIM	
		GRAND CANYON	
		NATIONAL PARK	
PKG. NO. 05	SHEET 9		
82	OF 12		



DETAIL

N.T.S.

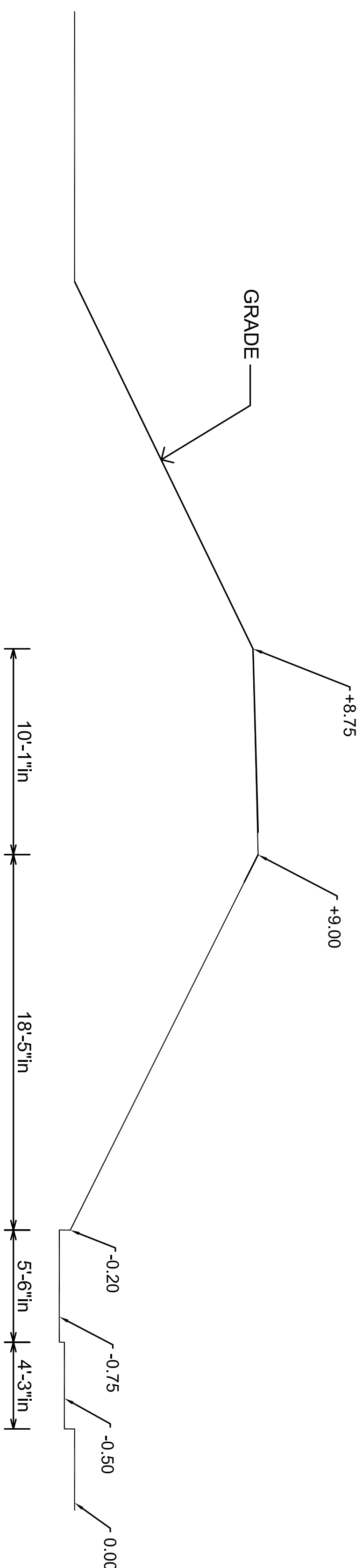
A

A-1

DETAIL

$1'' = 1'-0''$

B
A-



DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
STAD		REMEDIATE/REHABILITATE FIRING RANGE SOUTH RIM GRAND CANYON NATIONAL PARK	113
RC			4120
TECH. REVIEW:			PG. NO. SHEETS 05 34 OF 12 82
DATE:			
8/24/04			